

What is claimed is:

1. An interpolation processing apparatus that engages in processing on image data which are provided in a colorimetric system constituted of first ~ nth ($n \geq 2$) color components and include color information corresponding to a single color component provided at each pixel to determine an interpolation value equivalent to color information corresponding to the first color component for a pixel at which the first color component is missing, comprising:
- an interpolation value calculation section that uses color information at pixels located in a local area containing an interpolation target pixel to undergo interpolation processing to calculate an interpolation value including, at least
- (1) local average information of the first color component with regard to the interpolation target pixel and
- (2) local curvature information corresponding to at least two color components with regard to the interpolation target pixel.
2. An interpolation processing apparatus according to claim 1, wherein:
- said interpolation value calculation section

calculates, as said local curvature information

corresponding to at least two color components,

(1) local curvature information based upon a color
component matching a color component at the interpolation

5 target pixel and

(2) local curvature information based upon a color
component other than the color component at the
interpolation target pixel.

10 3. An interpolation processing apparatus that engages in
processing on image data which are provided in a

colorimetric system constituted of first ~ nth ($n \geq 2$)

color components and include color information

15 corresponding to a single color component provided at each
pixel to determine an interpolation value equivalent to

color information corresponding to the first color

component for a pixel at which the first color component
is missing, comprising:

an interpolation value calculation section that uses

20 color information at pixels located in a local area

containing an interpolation target pixel to undergo

interpolation processing to calculate an interpolation
value including, at least

(1) local average information of the first color

25 component with regard to the interpolation target pixel

and

(2) local curvature information based upon a color component other than a color component at the interpolation target pixel.

5

4. An interpolation processing apparatus that engages in processing on image data which are provided in a colorimetric system constituted of first ~ nth ($n \geq 2$) color components and include color information

10 corresponding to a single color component provided at each pixel to determine an interpolation value equivalent to color information corresponding to the first color component for a pixel at which the first color component is missing, comprising:

15 an interpolation value calculation section that uses color information at pixels located in a local area containing an interpolation target pixel to undergo interpolation processing to calculate an interpolation value including, at least

20 (1) local average information of the first color component with regard to the interpolation target pixel and

(2) local curvature information corresponding to the first color component with respect to the interpolation

25 target pixel.

5. An interpolation processing apparatus according to claim 1, further comprising:

a first similarity judgment section that judges
5 degrees of similarity to the interpolation target pixel along at least two directions in which pixels with color information corresponding to the first color component are connected with the interpolation target pixel; and

a second similarity judgment section that judges
10 degrees of similarity to the interpolation target pixel along at least two directions other than the directions in which the degrees of similarity are judged by said first similarity judgment section, wherein:

said interpolation value calculation section selects
15 a direction along which pixels having color information to be used to calculate said local average information of the first color component are set based upon results of a judgment made by said first similarity judgment section;

(1) said interpolation value calculation section
20 selects a direction along which pixels having color information to be used to calculate said local curvature information are set based upon results of the judgment made by said first similarity judgment section if said local curvature information is "local curvature
25 information constituted of a single color component and

manifesting directionality along a direction in which
degrees of similarity are judged by said first similarity
judgment section"; and

(2) said interpolation value calculation section
5 selects a direction along which pixels having color
information to be used to calculate said local curvature
information are set based upon results of a judgment made
by said second similarity judgment section if said local
curvature information is "local curvature information
10 constituted of a single color component and manifesting
directionality along a direction in which degrees of
similarity are judged by said second similarity judgment
section."

15 6. An interpolation processing apparatus that engages in
processing on image data which are provided in a
colorimetric system constituted of first ~ nth ($n \geq 2$)
color components and include color information
corresponding to a single color component provided at each
20 pixel to determine an interpolation value equivalent to
color information corresponding to the first color
component for a pixel at which the first color component
is missing, comprising:

an interpolation value calculation section that
25 calculates an interpolation value including at least two

terms, i.e., a first term and a second term by using color information at pixels set in a local area containing an interpolation target pixel to undergo interpolation processing;

5 a first similarity judgement section that judges degrees of similarity to the interpolation target pixel along at least two directions in which pixels having color information corresponding to the first color component are connected to the interpolation target pixel; and

10 a second similarity judgment section that judges degrees of similarity to the interpolation target pixel along at least two directions other than the directions in which the degrees of similarity are judged by said first similarity judgment section, wherein:

15 said interpolation value calculation section selects a direction along which pixels having color information to be used to calculate said first term are set based upon results of a judgment made by said first similarity judgment section and selects a direction along which
20 pixels having color information to be used to calculate said second term are set based upon results of a judgment made by said second similarity judgment section.

7. An interpolation processing apparatus according to
25 claim 6, wherein

said interpolation value calculation section:

calculates a term containing

(a) local average information of the first color component with regard to the interpolation target pixel and

5 (b) local curvature information constituted of a single color component and manifesting directionality along a direction in which degrees of similarity are judged by said first similarity judgment section, as said first term; and

10 calculates a term containing local curvature information constituted of a single color component and manifesting directionality along a direction in which degrees of similarity are judged by said second similarity judgment section, as said second term.

15

8. An interpolation processing apparatus according to claim 5, wherein:

when image data are provided in a colorimetric system constituted of first ~ third color components with the

20 first color component achieving a higher spatial frequency than the second color component and the third color component, the first color component set in a checker-board pattern, the second color component and the third color component each set in a line sequence between pixels

25 at which color information corresponding to the first

color component is present and information corresponding to the second color component present at the interpolation target pixel;

5 said first similarity judgment section calculates similarity degrees manifested by the interpolation target pixel along two directions, i.e., a vertical direction and a horizontal direction, in which pixels with color information corresponding to the first color component that are closest to the interpolation target pixel are
10 connected to the interpolation target pixel and makes a judgment with regard to degrees of similarity manifested by the interpolation target pixel along the vertical direction and the horizontal direction based upon a difference between said similarity degrees;

15 said second similarity judgment section calculates similarity degrees manifested by the interpolation target pixel along two diagonal directions in which pixels with color information corresponding to the third color component that are closest to the interpolation target
20 pixel are connected to the interpolation target pixel and makes a judgment with regard to degrees of similarity manifested by the interpolation target pixel along the two diagonal directions based upon a difference between said similarity degrees; and

25 said interpolation value calculation section selects

0937002 0040
T 01 39 2007 250

at least either the second color component or the first
color component based upon which said "local curvature
information constituted of a single color component and
manifesting directionality along a direction in which
5 degrees of similarity are judged by said first similarity
judgment section" is provided and selects at least either
the second color component or the third color component
based upon which said "local curvature information
constituted of a single color component and manifesting
10 directionality along a direction in which degrees of
similarity are judged by said second similarity judgment
section" is provided.

9. An interpolation processing apparatus according to
15 claim 8, wherein:

when said local curvature information is "local
curvature information based upon a color component other
than the color component at the interpolation target
pixel", said interpolation value calculation section
20 selects the first color component or the third color
component to which said local curvature information is to
correspond in conformance to the degrees of similarity
judged by said second similarity judgment section.

10. An interpolation processing apparatus according to

claim 9, wherein:

said interpolation value calculation section calculates local curvature information based upon the first color component if said second similarity judgment section judges that roughly equal degrees of similarity manifest along the two diagonal directions and calculates local curvature information based upon the third color component if said second similarity judgment section judges that a higher degree of similarity manifests along one of the two diagonal directions compared to the other diagonal direction.

11. An interpolation processing apparatus according to claim 8, wherein:

said first similarity judgment section judges that roughly equal degrees of similarity manifest along the vertical direction and the horizontal direction if a difference between the similarity degrees along the vertical direction and the horizontal direction is smaller than a specific threshold value; and

said second similarity judgment section judges that roughly equal degrees of similarity manifest along the two diagonal directions if a difference between the similarity degrees along the two diagonal directions is smaller than a specific threshold value.

12. An interpolation processing apparatus according to claim 8, wherein:

said first similarity judgment section calculates the similarity degrees along the vertical direction and the horizontal direction by using color information corresponding to a plurality of color components for a single interpolation target pixel; and

said second similarity judgment section calculates the similarity degrees along the two diagonal directions by using color information corresponding to a plurality of color components for a single interpolation target pixel.

13. An interpolation processing apparatus according to claim 12, wherein:

said second similarity judgment section calculates a similarity degree manifesting along each of the two diagonal directions through weighted addition of:

(1) a similarity degree component constituted of color information corresponding to the first color component alone;

(2) a similarity degree component constituted of color information corresponding to the second color component alone;

(3) a similarity degree component constituted of color

information corresponding to the third color component alone; and

(4) a similarity degree component constituted of color information corresponding to the second color component and the third color component.

14. An interpolation processing apparatus according to claim 8, wherein:

10 said first similarity judgment section calculates similarity degrees along the vertical direction and the horizontal direction for each pixel and makes a judgment on similarity manifested by the interpolation target pixel along the vertical direction and the horizontal direction based upon differences in similarity degrees manifesting at nearby pixels as well as at the interpolation target pixel; and

20 said second similarity judgment section calculates similarity degrees along the two diagonal directions for each pixel and makes a judgment on similarity manifested by the interpolation target pixel along the two diagonal directions based upon differences in similarity degrees manifesting at nearby pixels as well as at the interpolation target pixel.

25 15. An interpolation processing apparatus that engages in

processing on image data which are provided in a
colorimetric system constituted of first ~ nth ($n \geq 2$)
color components and include color information
corresponding to a single color component provided at each
5 pixel to determine an interpolation value equivalent to
color information corresponding to the first color
component for a pixel at which the first color component
is missing, comprising:

10 a first term calculation section that calculates a
first term representing average information of the first
color component with regard to an interpolation target
pixel to undergo interpolation processing by using color
information corresponding to color components at pixels
set in a local area containing the interpolation target
15 pixel;

a second term calculation section that calculates a
second term representing local curvature information based
upon a color component matching the color component at the
interpolation target pixel with regard to the
20 interpolation target pixel by using color information
corresponding to color components at pixels set in a local
area containing the interpolation target pixel; and

an interpolation value calculation section that
calculates an interpolation value by adding said second
25 term multiplied by a weighting coefficient constituted of

color information corresponding to a plurality of color components at pixels in the local area containing the interpolation target pixel to said first term.

5 16. An interpolation processing apparatus according to claim 15, wherein:

10 said interpolation value calculation section uses color information corresponding to a plurality of color components provided at the interpolation target pixel and at a plurality of pixels set along a predetermined direction relative to the interpolation target pixel to ascertain inclinations manifesting in color information corresponding to the individual color components along the direction and calculates said weighting coefficient in
15 conformance to a correlation manifesting among the inclinations in the color information corresponding to the individual color components.

17. An interpolation processing apparatus that implements
20 processing for supplementing a color component value at a pixel at which information corresponding to a color component is missing in image data provided in a colorimetric system constituted of a luminance component and the color component, with the luminance component
25 having a higher spatial frequency than the color component

and the luminance component present both at pixels having information corresponding to the color component and at pixels lacking information corresponding to the color component, comprising:

5 a hue value calculation section that calculates hue values at a plurality of pixels located near an interpolation target pixel to undergo interpolation processing and having both the luminance component and the color component by using luminance component values and
10 color component values at the individual pixels;

 a hue value interpolation section that calculates a hue value at the interpolation target pixel by using a median of the hue values at the plurality of pixels calculated by said hue value calculation section; and

15 a color conversion section that interpolates a color component at the interpolation target pixel by using the luminance component at the interpolation target pixel to convert the hue value at the interpolation target pixel calculated by said hue value interpolation section to a
20 color component.

18. An interpolation processing apparatus that implements processing for supplementing a luminance component at a pixel at which information corresponding to a luminance
25 component is missing and supplementing a color component

at a pixel at which information corresponding to a color component is missing, on image data provided in a colorimetric system constituted of the luminance component and the color component, with the luminance component
5 having a higher spatial frequency than the color component and a given pixel having only information corresponding to either the luminance component or the color component, comprising:

10 a luminance component interpolation section that interpolates a luminance component at a luminance component interpolation target pixel to undergo luminance component interpolation processing by using at least either "similarity manifesting between the luminance component interpolation target pixel and a pixel near the
15 luminance component interpolation target pixel" or "a plurality of color components within a local area containing the luminance component interpolation target pixel";

20 a hue value calculation section that calculates hue values at a plurality of pixels located near an interpolation target pixel to undergo color component interpolation processing, having color component values and having luminance component values interpolated by said luminance component interpolation section, by using the
25 luminance component values and color component values at

the individual pixels;

a hue value interpolation section that calculates a hue value for the interpolation target pixel by using a median of the hue values at the plurality of pixels

5 calculated by said hue value calculation section; and

a color conversion section that interpolates a color component value for the interpolation target pixel by using the luminance component value at the interpolation target pixel to convert the hue value at the interpolation target pixel calculated by said hue value interpolation section to a color component value.

19. An interpolation processing apparatus according to claim 17, wherein:

15 when the luminance component in the image data corresponds to a green color component and the color component in the image data corresponds to a red color component and a blue color component,

said hue value interpolation section calculates a hue value for the interpolation target pixel by using a median of hue values containing the red color component at pixels near the interpolation target pixel if the green color component is present but the red color component is missing at the interpolation target pixel and calculates a hue value for the interpolation target pixel by using a

median of hue values containing the blue color component at pixels near the interpolation target pixel if the green color component is present but the blue color component is missing at the interpolation target pixel.

5

20. An interpolation processing apparatus according to claim 17, wherein:

when the luminance component in the image data corresponds to a green color component and the color component in the image data corresponds to a red color component and a blue color component,

said hue value interpolation section calculates a hue value for the interpolation target pixel by using a median of hue values containing the red color component at pixels set near the interpolation target pixel if the blue color component is present but the red color component is missing at the interpolation target pixel.

21. An interpolation processing apparatus according to claim 17, wherein:

when the luminance component in the image data corresponds to a green color component and the color component in the image data corresponds to a red color component and a blue color component,

said hue value interpolation section calculates a hue

value for the interpolation target pixel by using a median
of hue values containing the blue color component at
pixels set near the interpolation target pixel if the red
color component is present but the blue color component is
5 missing at the interpolation target pixel.

22. An interpolation processing apparatus according to
claim 17, with a color component missing at the
interpolation target pixel present at only one pixel among
10 four pixels set symmetrically along the vertical direction
and the horizontal direction, wherein said hue value
interpolation section comprises:

a first hue value interpolation unit that calculates
a hue value for the interpolation target pixel by using a
15 median of hue values at a plurality of diagonally adjacent
pixels if the hue values of the plurality of diagonally
adjacent pixels adjacent to the interpolation target pixel
along diagonal directions have been calculated by said hue
value calculation section; and

20 a second hue value interpolation unit that calculates
a hue value for the interpolation target pixel by using a
median of hue values at a plurality of vertically and
horizontally adjacent pixels if the hue values of the
plurality of vertically and horizontally adjacent pixels
25 adjacent to the interpolation target pixel in the vertical

direction and the horizontal direction have been
calculated by said hue value calculation section or said
first hue value interpolation unit.

5 23. A recording medium having recorded therein an
interpolation processing program to implement on a
computer processing for determining an interpolation value
equivalent to color information corresponding to a first
color component missing at a pixel, on image data provided
10 in a colorimetric system constituted of first ~ nth ($n \geq$
2) color components with color information corresponding
to a single color component present at each pixel, said
interpolation processing program comprising:

an interpolation value calculation step in which an
15 interpolation value including, at least
(1) local average information of the first color
component with regard to an interpolation target pixel to
undergo interpolation processing and
(2) local curvature information corresponding to at least
20 two color components with regard to the interpolation
target pixel, is calculated by using color information
provided at pixels set within a local area containing the
interpolation target pixel.

25 24. A recording medium having recorded therein an

interpolation processing program to implement on a
computer processing for determining an interpolation value
equivalent to color information corresponding to a first
color component missing at a pixel, on image data provided
5 in a colorimetric system constituted of first ~ nth ($n \geq$
2) color components with color information corresponding
to a single color component present at each pixel, said
interpolation processing program comprising:

an interpolation value calculation step in which an
10 interpolation value including, at least
(1) local average information of the first color
component with regard to an interpolation target pixel to
undergo the interpolation processing; and
(2) local curvature information based upon a color
15 component other than a color component at the
interpolation target pixel, is calculated by using color
information provided at pixels set within a local area
containing the interpolation target pixel.

20 25. A recording medium having recorded therein an
interpolation processing program to implement on a
computer processing for determining an interpolation value
equivalent to color information corresponding to a first
color component missing at a pixel, on image data provided
25 in a colorimetric system constituted of first ~ nth ($n \geq$

2) color components with color information corresponding to a single color component present at each pixel, said interpolation processing program comprising:

an interpolation value calculation step in which an interpolation value including, at least

(1) local average information of the first color component with regard to an interpolation target pixel to undergo the interpolation processing, and

(2) local curvature information corresponding to the first color component with respect to the interpolation target pixel, is calculated by using color information provided at pixels set within a local area containing the interpolation target pixel.

26. A recording medium having recorded therein an interpolation processing program to implement on a computer processing for determining an interpolation value equivalent to color information corresponding to a first color component missing at a pixel, on image data provided in a colorimetric system constituted of first ~ nth ($n \geq 2$) color components with color information corresponding to a single color component present at each pixel, said interpolation processing program comprising:

an interpolation value calculation step in which an interpolation value including at least two terms, i.e., a

first term and a second term is calculated by using color information at pixels set within a local area containing an interpolation target pixel to undergo interpolation processing;

5 a first similarity judgment step in which degrees of similarity to the interpolation target pixel are judged along at least two directions in which pixels having color information corresponding to the first color component are connected with the interpolation target pixel; and

10 a second similarity judgment step in which degrees of similarity to the interpolation target pixel are judged along at least two directions other than the directions along which the degrees of similarity are judged in said first similarity judgment step, wherein:

15 in said interpolation value calculation step, a direction in which pixels having color information to be used to calculate said first term are set is selected based upon results of a judgment made in said first similarity judgment step and a direction in which pixels
20 having color information to be used to calculate said second term are set is selected based upon results of a judgment made in said second similarity judgment step.

27. A recording medium having recorded therein an
25 interpolation processing program to implement on a

computer processing for determining an interpolation value
equivalent to color information corresponding to a first
color component missing at a pixel, on image data provided
in a colorimetric system constituted of first ~ nth ($n \geq$
5 2) color components with color information corresponding
to a single color component present at each pixel, said
interpolation processing program comprising:

095877002 "001101
a first term calculation step in which a first term
representing average information of the first color
10 component with regard to an interpolation target pixel to
undergo interpolation processing is calculated by using
color information corresponding to a color component at
pixels set within a local area containing the
interpolation target pixel;

15 a second term calculation step in which a second term
representing local curvature information based upon a
color component matching the color component at the
interpolation target pixel is calculated with regard to
the interpolation target pixel by using color information
20 corresponding to a color component at pixels set within a
local area containing the interpolation target pixel; and

an interpolation value calculation step in which an
interpolation value is calculated by adding said second
term multiplied by a weighting coefficient constituted of
25 color information corresponding to a plurality of color

components provided at pixels set within a local area containing the interpolation target pixel to the first term.

5 28. A recording medium having recorded therein an interpolation processing program for implementing on a computer processing supplementing a color component value at a pixel at which information corresponding to a color component is missing, on image data provided in a
10 colorimetric system constituted of a luminance component and the color component, with the luminance component having a higher spatial frequency than the color component and the luminance component present both at pixels having information corresponding to the color component and at
15 pixels lacking information corresponding to the color component; said interpolation processing program comprising:

a hue value calculation step in which hue values for a plurality of pixels near an interpolation target pixel
20 to undergo interpolation processing and having information corresponding to both the luminance component and the color component are calculated by using luminance component values and color component values at the individual pixels;

25 a hue value interpolation step in which a hue value

for the interpolation target pixel is calculated by using
a median of the hue values at the plurality of pixels
calculated in the hue value calculation step; and

5 a color conversion step in which a color component
value at the interpolation target pixel is interpolated by
using a value indicated by the luminance component present
at the interpolation target pixel to convert the hue value
of the interpolation target pixel calculated in the hue
value interpolation step to a color component value.

10

29. A recording medium having recorded therein an
interpolation processing program for implementing on a
computer processing for supplementing a luminance
component value at a pixel at which information
15 corresponding to a luminance component is missing and a
color component value at a pixel at which information
corresponding to a color component missing, on image data
provided in a colorimetric system constituted of the
luminance component and the color component, with the
20 luminance component having a higher spatial frequency than
the color component and information corresponding to
either the luminance component or the color component
present at each pixel, said interpolation processing
program comprising:

25 a luminance component interpolation step in which a

luminance component value is interpolated for a luminance component interpolation target pixel to undergo luminance component interpolation processing by using at least either "similarity between the luminance component interpolation target pixel and a pixel near the luminance component interpolation target pixel" or "information corresponding to a plurality of color components within a local area containing the luminance component interpolation target pixel";

10 a hue value calculation step in which hue values at a plurality of pixels located near an interpolation target pixel to undergo color component interpolation processing, having color component values and having luminance component values interpolated in said luminance component interpolation step are calculated by using the luminance component values and color component values at the individual pixels;

20 a hue value interpolation step in which a hue value for the interpolation target pixel is calculated by using a median of the hue values at the plurality of pixels calculated in the hue value calculation step; and

25 a color conversion step in which a color component value is interpolated for the interpolation target pixel by using the luminance component value at the interpolation target pixel to convert the hue value at the

interpolation target pixel calculated in said hue value interpolation step to a color component value.

30. An interpolation processing apparatus according to
5 claim 2, further comprising:

a first similarity judgment section that judges
degrees of similarity to the interpolation target pixel
along at least two directions in which pixels with color
information corresponding to the first color component are
10 connected with the interpolation target pixel; and

a second similarity judgment section that judges
degrees of similarity to the interpolation target pixel
along at least two directions other than the directions in
which the degrees of similarity are judged by said first
15 similarity judgment section, wherein:

said interpolation value calculation section selects
a direction along which pixels having color information to
be used to calculate said local average information of the
first color component are set based upon results of a
20 judgment made by said first similarity judgment section;

(1) said interpolation value calculation section
selects a direction along which pixels having color
information to be used to calculate said local curvature
information are set based upon results of the judgment
25 made by said first similarity judgment section if said

local curvature information is "local curvature
information constituted of a single color component and
manifesting directionality along a direction in which
degrees of similarity are judged by said first similarity
5 judgment section"; and

(2) said interpolation value calculation section
selects a direction along which pixels having color
information to be used to calculate said local curvature
information are set based upon results of a judgment made
10 by said second similarity judgment section if said local
curvature information is "local curvature information
constituted of a single color component and manifesting
directionality along a direction in which degrees of
similarity are judged by said second similarity judgment
15 section."

31. An interpolation processing apparatus according to
claim 30, wherein:

when image data are provided in a colorimetric system
20 constituted of first ~ third color components with the
first color component achieving a higher spatial frequency
than the second color component and the third color
component, the first color component set in a checker-
board pattern, the second color component and the third
25 color component each set in a line sequence between pixels

at which color information corresponding to the first color component is present and information corresponding to the second color component present at the interpolation target pixel;

5 said first similarity judgment section calculates similarity degrees manifested by the interpolation target pixel along two directions, i.e., a vertical direction and a horizontal direction, in which pixels with color information corresponding to the first color component
10 that are closest to the interpolation target pixel are connected to the interpolation target pixel and makes a judgment with regard to degrees of similarity manifested by the interpolation target pixel along the vertical direction and the horizontal direction based upon a
15 difference between said similarity degrees;

 said second similarity judgment section calculates similarity degrees manifested by the interpolation target pixel along two diagonal directions in which pixels with color information corresponding to the third color
20 component that are closest to the interpolation target pixel are connected to the interpolation target pixel and makes a judgment with regard to degrees of similarity manifested by the interpolation target pixel along the two diagonal directions based upon a difference between said
25 similarity degrees; and

0937006 061001

said interpolation value calculation section selects at least either the second color component or the first color component based upon which said "local curvature information constituted of a single color component and manifesting directionality along a direction in which degrees of similarity are judged by said first similarity judgment section" is provided and selects at least either the second color component or the third color component based upon which said "local curvature information constituted of a single color component and manifesting directionality along a direction in which degrees of similarity are judged by said second similarity judgment section" is provided.

32. An interpolation processing apparatus according to claim 31, wherein:

when said local curvature information is "local curvature information based upon a color component other than the color component at the interpolation target pixel", said interpolation value calculation section selects the first color component or the third color component to which said local curvature information is to correspond in conformance to the degrees of similarity judged by said second similarity judgment section.

33. An interpolation processing apparatus according to claim 32, wherein:

said interpolation value calculation section calculates local curvature information based upon the first color component if said second similarity judgment section judges that roughly equal degrees of similarity manifest along the two diagonal directions and calculates local curvature information based upon the third color component if said second similarity judgment section judges that a higher degree of similarity manifests along one of the two diagonal directions compared to the other diagonal direction.

34. An interpolation processing apparatus according to claim 31, wherein:

said first similarity judgment section judges that roughly equal degrees of similarity manifest along the vertical direction and the horizontal direction if a difference between the similarity degrees along the vertical direction and the horizontal direction is smaller than a specific threshold value; and

said second similarity judgment section judges that roughly equal degrees of similarity manifest along the two diagonal directions if a difference between the similarity degrees along the two diagonal directions is smaller than

a specific threshold value.

35. An interpolation processing apparatus according to claim 31, wherein:

5 said first similarity judgment section calculates the similarity degrees along the vertical direction and the horizontal direction by using color information corresponding to a plurality of color components for a single interpolation target pixel; and

10 said second similarity judgment section calculates the similarity degrees along the two diagonal directions by using color information corresponding to a plurality of color components for a single interpolation target pixel.

15 36. An interpolation processing apparatus according to claim 35, wherein:

 said second similarity judgment section calculates a similarity degree manifesting along each of the two diagonal directions through weighted addition of:

20 (1) a similarity degree component constituted of color information corresponding to the first color component alone;

(2) a similarity degree component constituted of color information corresponding to the second color component
25 alone;

(3) a similarity degree component constituted of color information corresponding to the third color component alone; and

(4) a similarity degree component constituted of color information corresponding to the second color component and the third color component.

37. An interpolation processing apparatus according to claim 31, wherein:

10 said first similarity judgment section calculates similarity degrees along the vertical direction and the horizontal direction for each pixel and makes a judgment on similarity manifested by the interpolation target pixel along the vertical direction and the horizontal direction
15 based upon differences in similarity degrees manifesting at nearby pixels as well as at the interpolation target pixel; and

 said second similarity judgment section calculates similarity degrees along the two diagonal directions for
20 each pixel and makes a judgment on similarity manifested by the interpolation target pixel along the two diagonal directions based upon differences in similarity degrees manifesting at nearby pixels as well as at the interpolation target pixel.

25

38. An interpolation processing apparatus according to any one of claim 3, further comprising:

a first similarity judgment section that judges degrees of similarity to the interpolation target pixel along at least two directions in which pixels with color information corresponding to the first color component are connected with the interpolation target pixel; and

a second similarity judgment section that judges degrees of similarity to the interpolation target pixel along at least two directions other than the directions in which the degrees of similarity are judged by said first similarity judgment section, wherein:

said interpolation value calculation section selects a direction along which pixels having color information to be used to calculate said local average information of the first color component are set based upon results of a judgment made by said first similarity judgment section;

(1) said interpolation value calculation section selects a direction along which pixels having color information to be used to calculate said local curvature information are set based upon results of the judgment made by said first similarity judgment section if said local curvature information is "local curvature information constituted of a single color component and manifesting directionality along a direction in which

degrees of similarity are judged by said first similarity judgment section"; and

(2) said interpolation value calculation section selects a direction along which pixels having color information to be used to calculate said local curvature information are set based upon results of a judgment made by said second similarity judgment section if said local curvature information is "local curvature information constituted of a single color component and manifesting directionality along a direction in which degrees of similarity are judged by said second similarity judgment section."

39. An interpolation processing apparatus according to claim 18, wherein:

when the luminance component in the image data corresponds to a green color component and the color component in the image data corresponds to a red color component and a blue color component,

said hue value interpolation section calculates a hue value for the interpolation target pixel by using a median of hue values containing the red color component at pixels near the interpolation target pixel if the green color component is present but the red color component is missing at the interpolation target pixel and calculates a

hue value for the interpolation target pixel by using a
median of hue values containing the blue color component
at pixels near the interpolation target pixel if the green
color component is present but the blue color component is
5 missing at the interpolation target pixel.

40. An interpolation processing apparatus according to
claim 18, wherein:

when the luminance component in the image data
10 corresponds to a green color component and the color
component in the image data corresponds to a red color
component and a blue color component,

said hue value interpolation section calculates a hue
value for the interpolation target pixel by using a median
15 of hue values containing the red color component at pixels
set near the interpolation target pixel if the blue color
component is present but the red color component is
missing at the interpolation target pixel.

20 41. An interpolation processing apparatus according to
claim 18, wherein:

when the luminance component in the image data
corresponds to a green color component and the color
component in the image data corresponds to a red color
25 component and a blue color component,

05877002-051071
T01T002007850

said hue value interpolation section calculates a hue value for the interpolation target pixel by using a median of hue values containing the blue color component at pixels set near the interpolation target pixel if the red color component is present but the blue color component is missing at the interpolation target pixel.

42. An interpolation processing apparatus according to claim 18, with a color component missing at the interpolation target pixel present at only one pixel among four pixels set symmetrically along the vertical direction and the horizontal direction, wherein said hue value interpolation section comprises:

a first hue value interpolation unit that calculates a hue value for the interpolation target pixel by using a median of hue values at a plurality of diagonally adjacent pixels if the hue values of the plurality of diagonally adjacent pixels adjacent to the interpolation target pixel along diagonal directions have been calculated by said hue value calculation section; and

a second hue value interpolation unit that calculates a hue value for the interpolation target pixel by using a median of hue values at a plurality of vertically and horizontally adjacent pixels if the hue values of the plurality of vertically and horizontally adjacent pixels

adjacent to the interpolation target pixel in the vertical direction and the horizontal direction have been calculated by said hue value calculation section or said first hue value interpolation unit.